Jaden Rogers – Delivery Company SQL Report

Overview

The aim of this project is to build a database for a parcel delivery company. The parcel delivery company wishes to build a system to track its vehicles and drivers throughout the working day, i.e., from 8.00 am to 4:00 pm. The company has fitted each of its vehicles with a GPS tracking device which will send the data to a database hosted on a cloud system. A MySQL database schema will be used to store relevant data from these GPS devices. At the start of any day's work drivers use whatever vehicle is assigned to them by the company. Drivers work on shift basis, so a morning shift is from 8:00 am to 11:55 am and an afternoon shift is from 12:00 noon to 4:00 pm. Each shift will have 4 GPS updates for the location of the vehicle (one every hour while the driver is on the delivery route).

Requirements

The company wants to use this system to analyses vehicle, driver and parcel movements. The queries they have given as examples are:

- The location of any vehicle and its driver at any hour during the working day.
- The number of parcels delivered by any specific driver during a day's work.
- A listing of all the drivers.
- A listing of all the drivers who have only driven on morning hour shifts.

Design

Due to the requirements gathered from the company, the system will need to track the following data:

- Relevant data for each shift:
  - Driver
  - Vehicle
  - Shift time (morning/afternoon)
  - Number of parcels to be delivered on that route
  - GPS data

- Drivers employed by the company

- Vehicles owned by the company

Each shift will have a one-to-many relationship to drivers and vehicles as each shift could have any of the drivers and any of the vehicles assigned to it. However, it will also have a many to one relation with GPS updates as every shift will have 4 GPS updates.

Driver/Vehicle

The driver table consists of a primary key of the driver ID. An ID is necessary as different drivers could have the same names.

The vehicle table is set up in the same way as the driver table with a primary key of the vehicle ID.

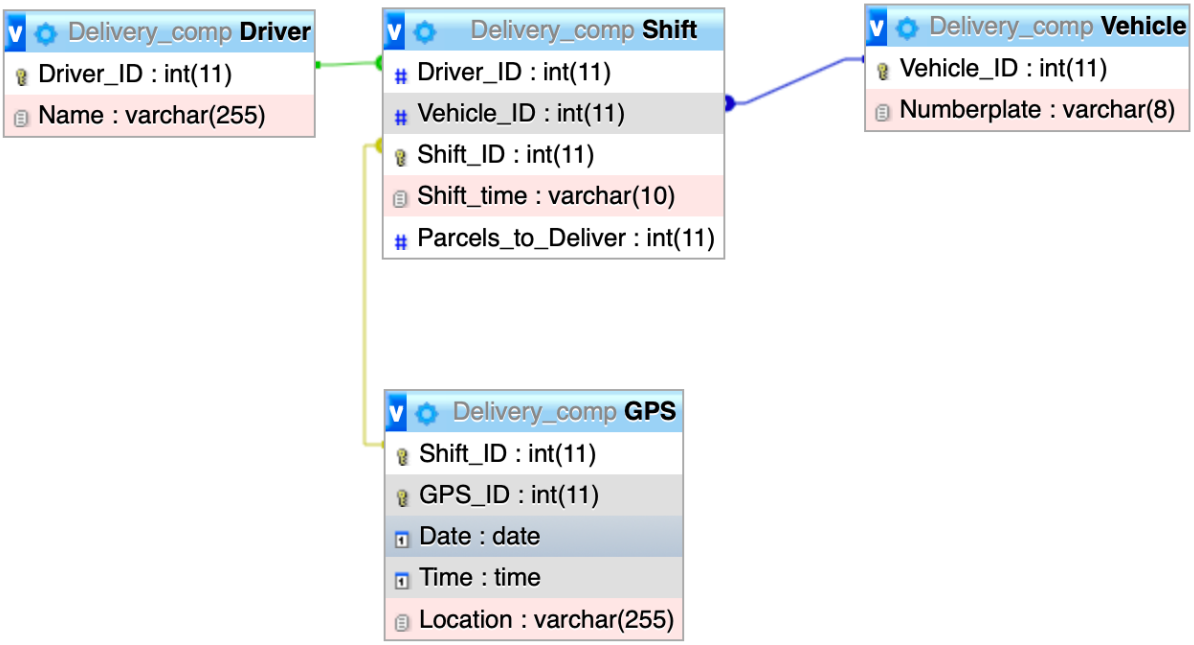
As a result of this, the company can easily add new employees and vehicles to their records. Furthermore, if the company decides to record more information about each vehicle's MOT status or fuel consumption for example, they can easily add these elements to the table.

Shift

Each shift will have a unique shift ID as the primary key as all the relevant information is solely reliant on the particular shift. This will record the driver and vehicle IDs, shift time and parcels to deliver.

GPS

The GPS table will have a composite key of shift ID and GPS ID. This is because each shift will have multiple GPS updates so the relevant data is reliant on both IDs



Testing

Data used

For the purpose of testing, temporary company data was created to be able to test the queries given by the company.

Shift Pattern

	Vehicle_ID	Monday	Tuesday	Wednesday	Thursday	Friday
Morning	**1**	Driver 1	Driver 1	Driver 1	Driver 1	Driver 1
Morning	**2**	Driver 2	Driver 2	Driver 2	Driver 2	Driver 2
Morning	**3**	Driver 3	Driver 3	Driver 3	Driver 3	Driver 3
Morning	**4**	Driver 4	Driver 4	Driver 4	Driver 4	Driver 4
Morning	**5**	Driver 5	Driver 5	Driver 5	Driver 5	Driver 5
Afternoon	**1**	Driver 6	Driver 6	Driver 6	Driver 6	Driver 6
Afternoon	**2**	Driver 7	Driver 7	Driver 7	Driver 7	Driver 7
Afternoon	**3**	Driver 8	Driver 8	Driver 8	Driver 8	Driver 8
Afternoon	**4**	Driver 9	Driver 9	Driver 9	Driver 9	Driver 9
Afternoon	**5**	Driver 10	Driver 10	Driver 10	Driver 10	Driver 10

The rest of the data is included in the GitHub repository:

- Driver: Driver_Data.csv
- Vehicle: Vehicle_Data.csv
- GPS: GPS_Data.csv
- Shift: Shift_Data.csv

Queries

Query 1 - The location of any vehicle and its driver at any hour during the working day.

```
SELECT Driver.Name, Shift.Vehicle_ID, GPS.Location, GPS.Date, GPS.Time
FROM  Driver
INNER JOIN Shift ON Driver.Driver_ID=Shift.Driver_ID
INNER JOIN GPS ON Shift.Shift_ID=GPS.Shift_ID
WHERE Shift.Vehicle_ID = 3 AND GPS.Time = '11:00:00' AND GPS.Date = '2021-01-21';
```

Name	Vehicle_ID	Location	Date	Time
Steve	3	Brampton	2021-01-21	11:00:00

This query was implemented in a procedure to provide ease of use and repeatability for the company with the following result (parameters (5, “12:00:00”, “2021-01-23”)):

```
CREATE OR REPLACE PROCEDURE Driver_Hourly_Location (Car_Num INT, Hour Time, Day DATE)
BEGIN
  SELECT Driver.Name, Shift.Vehicle_ID, GPS.Location, GPS.Date, GPS.Time
  FROM  Driver
  INNER JOIN Shift ON Driver.Driver_ID=Shift.Driver_ID
  INNER JOIN GPS ON Shift.Shift_ID=GPS.Shift_ID
  WHERE Shift.Vehicle_ID = Car_Num AND  GPS.Time = Hour AND GPS.Date = Day;
END;
//

DELIMITER ;
```

Name	Vehicle_ID	Location	Date	Time
Julio	5	Ramsey	2021-01-23	12:00:00

Query 2 - The number of parcels delivered by any specific driver during a day’s work.

```
SELECT DISTINCT Driver.Name, Shift.Parcels_to_Deliver, GPS.Date
FROM  Shift
INNER JOIN Driver ON Shift.Driver_ID=Driver.Driver_ID
INNER JOIN GPS ON Shift.Shift_ID=GPS.Shift_ID
WHERE Driver.Name = 'Candice' AND GPS.Date = '2021-01-23';
```

Name	Parcels_to_Deliver	Date
Candice	46	2021-01-23

This was also implemented in a procedure with the following result (with parameters(“Candice”, “2021-01-24”)):

```
DELIMITER //
  CREATE OR REPLACE PROCEDURE Driver_Parcels (Driver_Name varchar(10),Day DATE)
  BEGIN
    SELECT DISTINCT Driver.Name, Shift.Parcels_to_Deliver, GPS.Date
    FROM  Shift
    INNER JOIN Driver ON Shift.Driver_ID=Driver.Driver_ID
    INNER JOIN GPS ON Shift.Shift_ID=GPS.Shift_ID
    WHERE Driver.Name = Driver_Name AND GPS.Date = Day;
END;
//
```

Name	Parcels_to_Deliver	Date
Candice	62	2021-01-24

Query 3 - A listing of all the drivers.

```
SELECT Name FROM Driver;
```

Name
Pete
John
Steve
Perry
Malcolm
Phineas
Ferb
Candice
Junior
Julio

Query 4 - A listing of all the drivers who have only driven on morning hour shifts.

```
SELECT DISTINCT Driver.Name
FROM  Driver
INNER JOIN Shift ON Driver.Driver_ID=Shift.Driver_ID
WHERE Shift.Shift_time = 'Morning'
EXCEPT
SELECT DISTINCT Driver.Name
FROM  Driver
INNER JOIN Shift ON Driver.Driver_ID=Shift.Driver_ID
WHERE Shift.Shift_time = 'Afternoon';
```

Name
Pete
John
Steve
Perry
Malcolm